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Agricultural Memorandum No 689

Simulation of Non-Febrile Common Cold epidemiology

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Using Kew and Speke temperature data over 4 week periods starting 3 days earlier than 4 week periods of disease data (incidence per 100,000) with a notation.

I_4^1 = mean incidence over 4 weeks of non-febrile common cold.

F_4 = infection, the I_4 for the previous period.

M = immunity, the mean of I_4 over previous three 4 week periods in excess of 150.

T_c = mean air minima to a maximum of 6°C.

T_d = mean air minima in excess of 6°C.

ΔT = change in mean air minima from previous 4 weeks period

then

$$\sqrt{I_4^1} = 0.37\sqrt{F_4} - 0.13\sqrt{M} - 0.25T_c - 0.44T_d - 0.23\Delta T + 9.8$$

Starting with the 4 weeks ending 18 June 1967, when I_4 = 107 and M = 0, each successive I_4, F_4 and M can then be calculated using weather data only. This simulation produces the estimates recorded in the appendix, which have a correlation of 0.85 with the actual disease date.

Any comments or suggestions on this paper should be referred to the author.

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December 1974

APPENDIX

Comparison of actual and simulated disease data

Data Set No	Disease Actual	Disease Estimated
7	91	78
8	61	67
9	74	86
10	182	101
11	179	151
12	266	209
13	298	218
14	198	190
15	236	197
16	226	169
17	141	159
18	128	142
19	119	106
20	76	82
21	66	78
22	55	86
23	129	89
24	165	112
25	204	185
26	240	225
27	210	192
28	189	222
29	211	187
30	123	174
31	123	123
32	112	128
33	93	94
34	62	77
35	67	79
36	138	108
37	127	128
38	172	213
39	263	231
40	154	209
41	155	202
42	184	188
43	134	174
44	134	125
45	110	96
46	87	85
47	64	80
48	62	90
49	112	109
50	158	153
51	174	196
52	239	202
53	202	202
54	205	180
55	200	186

Data Set No	Disease Actual	Disease Estimated
56	126	156
57	108	150
58	107	121
59	100	92
60	65	90
61	70	86
62	152	131
63	154	155
64	148	206
65	207	170
66	193	185
67	234	204
68	180	182
69	126	151
70	120	151
71	108	129
72	104	114
73	91	85
74	63	105
75	142	148
76	161	163
77	154	202
78	225	184
79	211	197
80	213	182
81	171	187
82	145	177
83	90	154
84	104	114
85	83	82
86	78	86
87	55	85
88	107	109
89	177	170
90	165	202
91	192	224
92	203	168
93	247	174
94	241	189
95	176	169
96	135	169
97	118	121
98	102	94
99	81	86